Trend Study 10R-34-02

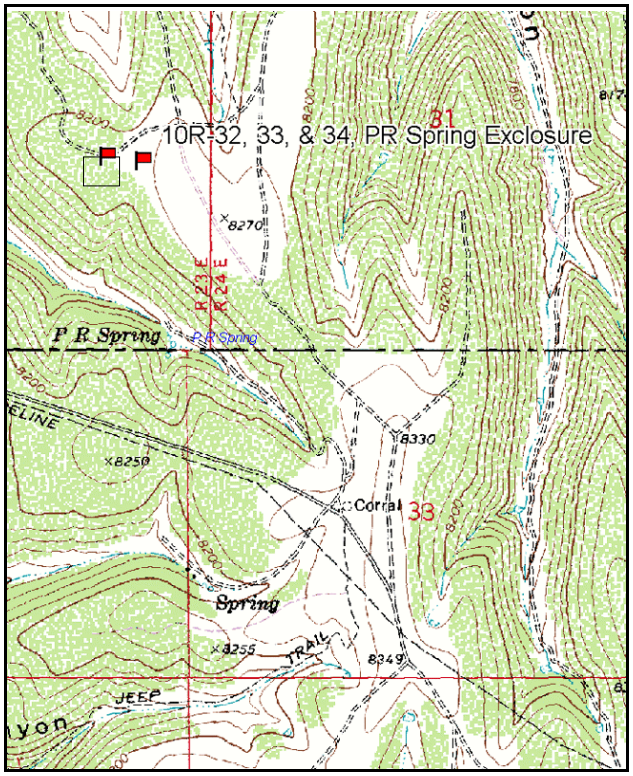
Study site name: P R Spring Exclosure Outside  Vegetation type: Mountain Brush

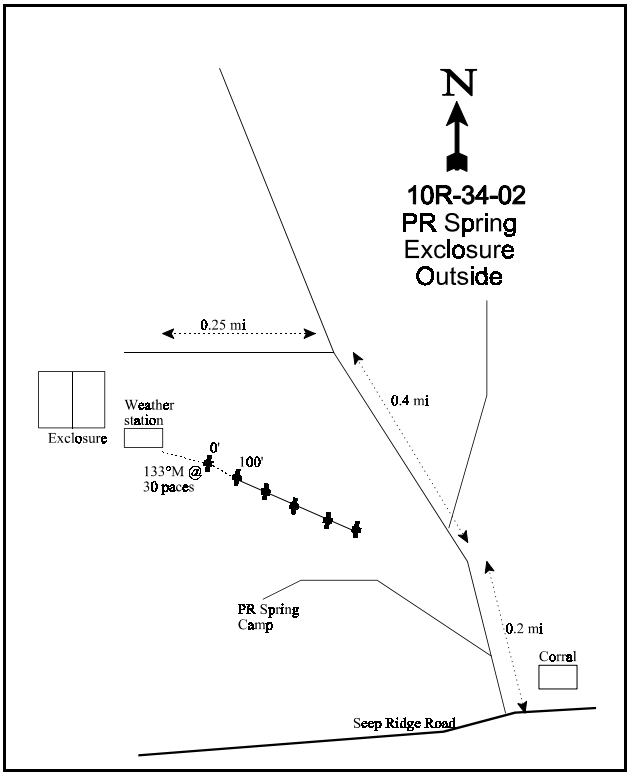
Compass bearing: frequency baseline__degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (95ft), line 5 (71ft). Rebar: belt 1 on 1ft.

LOCATION DESCRIPTION

On the Seep Ridge Road go to the PR Spring turnoff. Travel 0.2 miles staying right (do not go down road to PR Spring and campground). Continue left 0.4 miles. Turn left once again and travel approximately 0.25 miles to a weather station then the exclosure. From the southeast corner of the weather station the 0-foot stake is 150 feet at 133 degrees magnetic. The 0-foot stake is marked by browse tag number 424.




Map Name: P R Spring  Diagrammatic Sketch

Township 15S, Range 23E, Section 36  GPS: NAD 27, UTM 12S 4369893 N 647556 E

## DISCUSSION

### PR Spring Exclosure Outside - Study No. 10R-34

This transect samples the mountain brush community outside of and surrounding the exclosure complex at PR Spring. This site slopes gently (5-10%) to the southwest at an elevation of about 8,000 feet. This site is accessible by all classes of animals as it lies outside the exclosure. Because this transect lies outside of the exclosure complex, it is not restricted and is a full 500 feet in length. In 2002, big game use was moderate while livestock use was light. A pellet group transect read on site estimated 31 elk days use/acre (78 edu/ha), 73 deer days use/acre (180 ddu/ha), and 14 cow days use/acre (34 cdu/ha). All cattle pats were from the grazing season of 2001, while the deer and elk pellet groups were from late winter and spring.

Soils are clay loam in texture and neutral in reactivity (pH of 6.7). Effective rooting depth along the baseline averaged nearly 13 inches. The soil profile is rocky throughout. The soil surface outside the exclosure has moderately high pedestalling around shrubs leaving the interspaces with a pitted appearance. There are many game and livestock trails transecting the site. This is where most of the bare ground is found. Vegetation and litter cover are abundant where erosion appears to be minimized, except along the trails. The erosion condition class bordered on being stable and slight in 2002.

The key browse component outside the exclosure complex contains the same species as those within both the total and livestock exclosures, but dominance levels of these species differ. Mountain big sagebrush remains abundant, but bitterbrush is more abundant outside the exclosure and serviceberry and true mountain mahogany are minor components. Mountain big sagebrush and bitterbrush provided 72% of the browse cover with estimated densities of respectively 4,180 plants/acre and 1,840 plants/acre. The mountain big sagebrush population has moderately high decadence (32%) and low recruitment (7%), but mostly light use and good vigor. Bitterbrush has been heavily utilized, but has good recruitment by young plants (22%), low decadence, and normal vigor. Serviceberry density was estimated at 1,220 plants/acre in 2002 with moderate to heavy use, good vigor, very high recruitment (66%), and low decadence. Mahogany density was estimated at 480 plants/acre with high recruitment (46%), low decadence, mostly good vigor, and moderate to heavy use. Annual leader growth for these key species was low in 2002 averaging about one inch outside the exclosure. Snowberry is also abundant outside the exclosure with an estimated 3,340 plants/acre in 2002.

As with the total and livestock exclosure transects, the understory outside has fair diversity and good composition. Three perennial grasses are particularly abundant outside the exclosure, *Carex*, mutton bluegrass, and Kentucky bluegrass. Thickspike wheatgrass is also moderately abundant. The majority of the grass plants occur underneath shrub crowns, which did not appear to have been utilized at the time of sampling in late June 2002. Forbs are diverse and well distributed throughout the site. The most abundant species include mat penstemon, longleaf phlox, rose pussytoes, Eaton fleabane, silvery lupine, and an *astragalus*. As this is summer range for wildlife, forbs are of particular importance. With the abundance of browse throughout this area, the understory could be greatly improved with a prescribed burn or other treatment to decrease the canopy and density of shrubs and favor an increase in herbaceous plants.

APPARENT TREND ASSESSMENT

Soils are well protected by vegetation and litter cover on the site, except for the areas impacted by nearby game and livestock trails. Erosion is apparent on the trails transecting the site but the condition class was determined as stable to slight overall. Soils appear stable at the present time. The browse component outside the exclosure is abundant and diverse, but currently has a relatively too high of a proportion of mountain big sagebrush. Although palatable, mountain big sagebrush is less preferred in the summer than bitterbrush, serviceberry, and mahogany, and a treatment to reduce the amount of sagebrush should be considered. Prescribed burning is a good option because most of the highly preferred browse species will resprout after fire, while most of the mountain big sagebrush would be removed. Because the herbaceous component is diverse and moderately abundant, there is an adequate seed-bank and the herbaceous understory would be greatly improved following treatment. Both the browse and herbaceous components appear stable at this time. Further increases in shrub densities and canopy cover would be negative for the herbaceous understory.

HERBACEOUS TRENDS --
Herd unit 10R, Study no: 34

| Type | Species | Nested Frequency '02 | Quadrat Frequency '02 | Average Cover % '02 |
|---|---|---|---|---|
| G | Agropyron dasystachyum | 144 | 56 | 1.09 |
| G | Agropyron spicatum | 4 | 3 | .06 |
| G | Carex spp. | 147 | 54 | 5.56 |
| G | Festuca ovina | 4 | 1 | .00 |
| G | Poa fendleriana | 189 | 62 | 4.75 |
| G | Poa pratensis | 178 | 57 | 4.47 |
| G | Poa secunda | 10 | 4 | .02 |
| G | Stipa columbiana | 3 | 1 | .38 |
| Total for Annual Grasses | | 0 | 0 | 0 |
| Total for Perennial Grasses | | 679 | 238 | 16.36 |
| Total for Grasses | | 679 | 238 | 16.36 |
| F | Agoseris glauca | 28 | 13 | .11 |
| F | Alyssum alyssoides (a) | 9 | 4 | .02 |
| F | Antennaria rosea | 26 | 9 | .93 |
| F | Androsace septentrionalis (a) | 8 | 5 | .05 |
| F | Arenaria spp. | 21 | 6 | .25 |
| F | Astragalus spp. | 30 | 16 | .49 |
| F | Astragalus utahensis | 13 | 8 | .06 |
| F | Castilleja flava | 13 | 6 | .05 |
| F | Cirsium spp. | 2 | 1 | .00 |
| F | Crepis acuminata | 9 | 5 | .05 |
| F | Erigeron eatonii | 92 | 47 | .65 |
| F | Eriogonum umbellatum | 23 | 12 | .13 |

| Type | Species | Nested Frequency '02 | Quadrat Frequency '02 | Average Cover % '02 |
|---|---|---|---|---|
| F | Hackelia patens | 1 | 1 | .03 |
| F | Lepidium spp. (a) | 4 | 2 | .01 |
| F | Linum lewisii | 1 | 1 | .00 |
| F | Lupinus argenteus | 43 | 24 | .54 |
| F | Microsteris gracilis (a) | 7 | 2 | .01 |
| F | Penstemon caespitosus | 129 | 54 | 1.33 |
| F | Phlox hoodii | 2 | 1 | .00 |
| F | Phlox longifolia | 129 | 58 | .98 |
| F | Polygonum douglasii (a) | 4 | 3 | .01 |
| F | Potentilla gracilis | 2 | 1 | .03 |
| F | Senecio integerrimus | 6 | 2 | .03 |
| F | Taraxacum officinale | 54 | 25 | .30 |
| F | Tragopogon dubius | 2 | 1 | .00 |
| F | Viola spp. | 2 | 1 | .03 |
| Total for Annual Forbs | | 32 | 16 | 0.10 |
| Total for Perennial Forbs | | 628 | 292 | 6.05 |
| Total for Forbs | | 660 | 308 | 6.16 |

BROWSE TRENDS --
Herd unit 10R, Study no: 34

| Type | Species | Strip Frequency '02 | Average Cover % '02 |
|---|---|---|---|
| B | Amelanchier utahensis | 41 | .39 |
| B | Artemisia tridentata vaseyana | 91 | 22.69 |
| B | Cercocarpus montanus | 15 | .76 |
| B | Chrysothamnus depressus | 1 | .00 |
| B | Chrysothamnus viscidiflorus viscidiflorus | 35 | .78 |
| B | Purshia tridentata | 63 | 2.77 |
| B | Quercus gambelii | 1 | - |
| B | Symphoricarpos oreophilus | 77 | 8.12 |
| B | Tetradymia canescens | 3 | - |
| Total for Browse | | 327 | 35.54 |

CANOPY COVER -- LINE INTERCEPT
Herd unit 10R, Study no: 34

| Species | Percent Cover '02 |
|---|---|
| Amelanchier utahensis | 1.08 |
| Artemisia tridentata vaseyana | 26.08 |
| Cercocarpus montanus | 1.08 |
| Chrysothamnus viscidiflorus viscidiflorus | .67 |
| Purshia tridentata | 5.00 |
| Symphoricarpos oreophilus | 8.50 |
| Tetradymia canescens | .07 |

Browse Annual Leader Growth
Herd unit 10R , Study no: 34

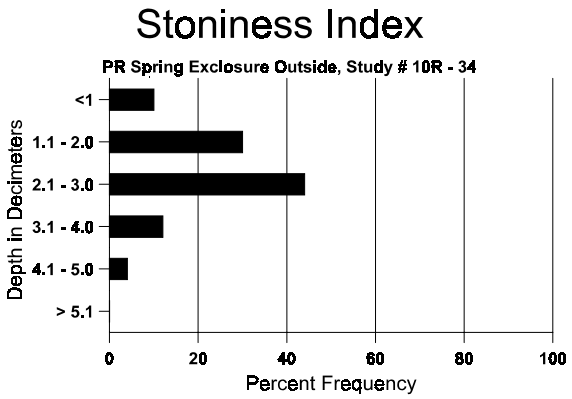
| Species | Average leader growth (in) '02 |
|---|---|
| Amelanchier utahensis | 1.1 |
| Cercocarpus montanus montanus | 0.9 |
| Artemisia tridentata vaseyana | 0.8 |

BASIC COVER --
Herd unit 10R, Study no: 34

| Cover Type | Nested Frequency '02 | Average Cover % '02 |
|---|---|---|
| Vegetation | 433 | 52.77 |
| Rock | 15 | .16 |
| Pavement | 133 | 2.59 |
| Litter | 479 | 53.15 |
| Cryptogams | 11 | .03 |
| Bare Ground | 219 | 13.12 |

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 34, PR Spring Outside Exclosure

| Effective rooting depth (in) | Temp °F (depth) | pH | %sand | %silt | %clay | %0M | PPM P | PPM K | dS/m |
|---|---|---|---|---|---|---|---|---|---|
| 12.93 | - | 6.8 | 35.3 | 32.7 | 32.0 | 3.6 | 14.9 | 291.2 | 0.8 |




PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 34

| Type | Quadrat Frequency '02 | Pellet Groups per Acre '02 | Days Use per Acre (ha) '02 |
|---|---|---|---|
| Rabbit | 12 | - | - |
| Grouse | 1 | - | - |
| Elk | 24 | 409 | 31 (78) |
| Deer | 19 | 948 | 73 (180) |
| Cattle | 2 | 165 | 14 (34) |

BROWSE CHARACTERISTICS --
Herd unit 10R, Study no: 34

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Amelanchier utahensis | | | | | | | | | | | | | | | | | | |
| S | 02 | - | - | - | 1 | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| Y | 02 | 10 | 3 | 5 | 11 | - | - | 11 | - | - | 40 | - | - | - | 800 | | | 40 |
| M | 02 | 1 | 6 | 3 | - | - | 1 | 1 | - | - | 12 | - | - | - | 240 | 43 | 33 | 12 |
| D | 02 | - | 1 | 7 | - | - | 1 | - | - | - | 7 | - | - | 2 | 180 | | | 9 |
| X | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 80 | | | 4 |
| % Plants Showing '02 | | | Moderate Use 16% | | | Heavy Use 28% | | | Poor Vigor 03% | | | | | | %Change | | | |
| Total Plants/Acre (excluding Dead & Seedlings) | | | | | | | | | | | '02 | | | | 1220 | Dec: | | 15% |
| Artemisia tridentata vaseyana | | | | | | | | | | | | | | | | | | |
| S | 02 | 12 | - | - | - | - | - | - | - | - | 12 | - | - | - | 240 | | | 12 |
| Y | 02 | 15 | - | - | - | - | - | - | - | - | 15 | - | - | - | 300 | | | 15 |
| M | 02 | 100 | 21 | 1 | 6 | - | - | - | - | - | 128 | - | - | - | 2560 | 31 | 38 | 128 |
| D | 02 | 51 | 8 | 4 | 3 | - | - | - | - | - | 50 | - | - | 16 | 1320 | | | 66 |
| X | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 520 | | | 26 |
| % Plants Showing '02 | | | Moderate Use 14% | | | Heavy Use 02% | | | Poor Vigor 08% | | | | | | %Change | | | |
| Total Plants/Acre (excluding Dead & Seedlings) | | | | | | | | | | | '02 | | | | 4180 | Dec: | | 32% |

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cercocarpus montanus | | | | | | | | | | | | | | | | | | |
| S | 02 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| Y | 02 | 2 | 5 | - | 2 | - | - | 2 | - | - | 11 | - | - | - | 220 | | | 11 |
| M | 02 | - | 1 | 5 | - | 1 | 2 | 1 | - | 1 | 11 | - | - | - | 220 | 49 | 36 | 11 |
| D | 02 | - | 1 | 1 | - | - | - | - | - | - | - | - | - | 2 | 40 | | | 2 |
| % Plants Showing '02 | | | | Moderate Use 33% | | | Heavy Use 38% | | | | Poor Vigor 08% | | | | | %Change | | |
| Total Plants/Acre (excluding Dead & Seedlings) | | | | | | | | | | | | | '02 | | 480 | Dec: | | 8% |
| Chrysothamnus depressus | | | | | | | | | | | | | | | | | | |
| M | 02 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - | 40 | 2 | 3 | 2 |
| % Plants Showing '02 | | | | Moderate Use 00% | | | Heavy Use 00% | | | | Poor Vigor 00% | | | | | %Change | | |
| Total Plants/Acre (excluding Dead & Seedlings) | | | | | | | | | | | | | '02 | | 40 | Dec: | | - |
| Chrysothamnus viscidiflorus viscidiflorus | | | | | | | | | | | | | | | | | | |
| Y | 02 | 7 | - | - | - | - | - | - | - | - | 7 | - | - | - | 140 | | | 7 |
| M | 02 | 47 | 1 | - | 1 | - | - | - | - | - | 49 | - | - | - | 980 | 14 | 17 | 49 |
| D | 02 | 7 | 2 | - | - | - | - | - | - | - | 6 | - | - | 3 | 180 | | | 9 |
| % Plants Showing '02 | | | | Moderate Use 05% | | | Heavy Use 00% | | | | Poor Vigor 05% | | | | | %Change | | |
| Total Plants/Acre (excluding Dead & Seedlings) | | | | | | | | | | | | | '02 | | 1300 | Dec: | | 14% |
| Purshia tridentata | | | | | | | | | | | | | | | | | | |
| Y | 02 | 5 | 8 | 5 | 2 | - | - | - | - | - | 20 | - | - | - | 400 | | | 20 |
| M | 02 | 6 | 3 | 36 | 2 | 1 | 17 | - | - | 1 | 66 | - | - | - | 1320 | 14 | 25 | 66 |
| D | 02 | - | - | 3 | - | 1 | 2 | - | - | - | 5 | - | - | 1 | 120 | | | 6 |
| % Plants Showing '02 | | | | Moderate Use 14% | | | Heavy Use 70% | | | | Poor Vigor 01% | | | | | %Change | | |
| Total Plants/Acre (excluding Dead & Seedlings) | | | | | | | | | | | | | '02 | | 1840 | Dec: | | 7% |
| Quercus gambelii | | | | | | | | | | | | | | | | | | |
| Y | 02 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| M | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 76 | 36 | 0 |
| % Plants Showing '02 | | | | Moderate Use 00% | | | Heavy Use 00% | | | | Poor Vigor 00% | | | | | %Change | | |
| Total Plants/Acre (excluding Dead & Seedlings) | | | | | | | | | | | | | '02 | | 20 | Dec: | | - |

| AGE | YR | Form Class (No. of Plants) 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Vigor Class 1 | 2 | 3 | 4 | Plants Per Acre | Average (inches) Ht. | Cr. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Symphoricarpos oreophilus | | | | | | | | | | | | | | | | | | |
| Y | 02 | 23 | - | - | 1 | - | - | 1 | - | - | 24 | - | - | - | 500 | | | 25 |
| M | 02 | 105 | 9 | 12 | 12 | - | - | 1 | - | - | 139 | - | - | - | 2780 | 16 | 25 | 139 |
| D | 02 | 2 | - | 1 | - | - | - | - | - | - | 1 | - | - | 2 | 60 | | | 3 |
| X | 02 | - | - | - | - | - | - | - | - | - | - | - | - | - | 80 | | | 4 |
| % Plants Showing '02 | | Moderate Use 05% | | Heavy Use 08% | | Poor Vigor 01% | | | | | | | | | %Change | | | |
| Total Plants/Acre (excluding Dead & Seedlings) | | | | | | | | | | | '02 | | | | 3340 | Dec: | | 2% |
| Tetradymia canescens | | | | | | | | | | | | | | | | | | |
| Y | 02 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | 20 | | | 1 |
| M | 02 | 1 | 1 | - | - | - | - | - | - | - | 2 | - | - | - | 40 | 8 | 8 | 2 |
| % Plants Showing '02 | | Moderate Use 33% | | Heavy Use 00% | | Poor Vigor 00% | | | | | | | | | %Change | | | |
| Total Plants/Acre (excluding Dead & Seedlings) | | | | | | | | | | | '02 | | | | 60 | Dec: | | - |

PR Spring Exclosure Complex - Summary

Because the exclosure complex was built only the year prior to the establishment of these transects, treatment effects cannot be determined from the data at the present time. However, the data does provide a baseline for the vegetation community sampled by these studies. Future readings will allow monitoring of changes and comparisons between the treatments to be evaluated.

It is important to point out that the exclosure complex was not built in a totally homogeneous area. The total and livestock exclosures were placed in an area where several browse species are moderately abundant. This includes large, tree-like serviceberry plants that provide an abundance of overhead canopy cover. The transect that monitors the community outside of the exclosures is much more open where mountain big sagebrush is the dominant species. Due to the dimensions of the exclosure, the transects established inside the total and livestock exclosures are only 200 feet in length, while the transect outside is 500 feet long. Some of the difference in vegetation characteristics between these studies arises from differing transect lengths as well as the heterogeneity of the vegetation community.

Basic ground cover characteristics are similar between all of the transects. Vegetation and litter cover are abundant, especially the browse component. Bare ground ranges from 16% inside the livestock exclosure to only 7% within the total exclosure. Rock and pavement are low on all the treatments.

The browse component dominates the vegetation community on all transects. Inside the total exclosure, browse accounts for 74% of the total vegetation cover. Shrubs provide about 60% of the vegetation cover both inside the livestock exclosure and outside the exclosure complex. Herbaceous species, especially forbs, are somewhat limited on these studies. Grasses provide respectively 28%, 24%, and 11% of the vegetation cover in the total exclosure, livestock exclosure, and outside the exclosure complex. Forbs provide 16% or less of the total cover on all sites.